KILN OPERATION & MAINTENANCE PLAN

CONTINUOUS EMISSIONS MONITORING SYSTEM

American Cement Company, LLC
Sumterville, FL

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Section on Startup and Shutdown of Kiln system

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1. INTRODUCTION

This document, Kiln Operation and Maintenance Plan (Kiln O&M Plan) describes the Operation and Maintenance of the kiln system (EU-003) and includes the quality assurance plan (PLAN) for the continuous emissions monitoring systems (CEMS) installed to monitor EU-003 at American Cement Company, LLC in Sumterville, Florida. The PLAN contains quality assessment (QA) and quality control (QC) procedures for the CEMS designed to monitor and record the emissions and flow from the in-line kiln/raw mill stack and to subsequently calculate the applicable mass emission rates (lb/hr) and process emission factors (lb/ton) of the stack for regulatory reporting purposes. The CEMS includes a Sick/Maihak MCS100E CO, NO, SO_2, NO_2, CO_2 analyzer, a Sick/Maihak Flowsic 100 gas flow monitor, a Thermo Scientific Model 81i Mercury Calibrator, and a EuroFID THC analyzer. A NEXUS Corporation data acquisition and handling system (DAHS) is used to compile the CEMS data.

The Portland Cement Plant is subject to Federal regulations 40 CFR 60, and 40 CFR 63 Subpart LLL – National Emissions Standards for Hazardous Air Pollutants from the Portland Cement Manufacturing Industry. Part 60 contains Emissions Guidelines for the facility and specifies continuous emissions monitoring (CEM) using a system operated in accordance with 60.13; and 40 CFR 60, Appendix F, Procedure 1: Quality Assurance Requirements for Gas Continuous Emission Monitoring Systems Used for Compliance Determination. Appendix F requires the operator of a subject CEMS to implement a QC program with written procedures for calibration of the CEMS; calibration drift determination and CEMS adjustments; preventive maintenance (including a spare parts inventory); accuracy audits; corrective actions; and data recording, calculations, and reporting.

Section 1 of this document provides an overview of the plan, including a discussion of program goals and implementation strategies. Descriptions of the source and the CEM systems are presented in Sections 2 and 3. Section 4 describes the procedures used to check and adjust the CEMS calibration. Sections 5 and 6 contain specific QA and QC procedures used to maintain, audit, and document CEMS performance on a routine basis. Section 7 prescribes corrective action procedures to be initiated upon discovery of a CEMS malfunction and Section 8 describes data recording, calculation, and reporting requirements.

1.1 PROGRAM GOALS

The Plan was developed to achieve the following goals:

1. Ensure the kiln is in compliance with NESHAP LLL requirements
2. Ensure the CEMS is operated in accordance with the US EPA continuous monitoring requirements under 40 CFR 60.13 and Appendix F, and 40 CFR 63 Subpart LLL.
3. Provide for CEM data quality assessment and data quality control.
4. Provide complete documentation of the QA, QC, and corrective action procedures.
5. Promote consistency of QA and QC activities between system operators.
6. Maximize the efficiency of electronics, instrumentation, and auditing activities while maintaining satisfactory system performance and data availability.
7. Procedures to be followed should any of the kiln emission control units malfunction.
8. Provide a kiln maintenance schedule and inspection plan to be implemented during periods of operation and kiln shutdown and immediately prior to startup.
9. An inspection schedule to ensure all kiln equipment is operating adequately. *(The schedule shall include inspections before restarting the kiln after a shut down.)*
10. A detailed description of the kiln baghouse bag replacement method and frequency, and methods to avoid bag malfunction.
11. Procedures to follow during startup, shutdown, and/ or malfunction of the baghouse, identifying steps taken and protocol to limit exceedances

1.2 PROGRAM STRUCTURE

The PLAN structure is built on a well-defined set of quality assessment (QA) and quality control (QC) procedures.

The QA procedures include daily calibration drift checks and quarterly audits of the monitoring systems. These procedures assess data accuracy against a defined set of quality control standards (daily calibration filters and gas standards, EPA protocol audit gases, and EPA reference methods). When a QA check indicates unacceptable data accuracy corrective actions are initiated and the system performance is reassessed. This process is repeated until the results of the QA check meet the applicable data accuracy specifications.

The QC procedures include routine electronics, instrumentation, and inspection activities. These procedures are used to support the QA activities, to minimize unexpected system failures, and to maintain the accuracy and quality of the CEMS data.

1.3 PLAN IMPLEMENTATION

The Environmental Manager, the Operations Manager, the Electrical and Instrumentation Department, the Plant Operators (POs), the Shift Supervisor(s), and the Purchasing department will all implement various aspects of the PLAN. Contractors may also be employed when it is efficient to do so.

The Environmental Manager will oversee PLAN implementation, assess PLAN efficacy, and periodically initiate the PLAN revision process. The Environmental Manager will also: (1) be the primary contact between the plant and the Agency; (2) compile, review, and report quality assurance, corrective action, and emissions data; (3) be notified of CEMS malfunctions, potential and actual non-compliance with emissions standards, calibration drift limits, and accuracy audit specifications; (4) consult with E&I personnel when a CEMS malfunction is encountered; (5) track the CEMS data availability and consult with the Operations Manager to plan alternative monitoring procedures when the CEMS data availability is insufficient to comply with the applicable monitoring requirements; (6) be notified of process malfunctions and periods of excess emissions; and (7) collect the Excess Emission (EE) reports.

The Shift Supervisor(s) will ensure the corrective actions are implemented in the event of a CEMS malfunction. Alternative monitoring procedures using EPA Reference Method 19 or other procedures approved by the Agency will be implemented as needed to meet the CEMS data availability standards.

E&I personnel are responsible for maintaining the CEMS. They will: (1) evaluate the daily calibration drift data; (2) perform the periodic QC checks and routine CEMS maintenance; (3) perform or oversee performance of all CEMS repairs; (4) perform or oversee performance of the periodic QA audits; (5) report CEMS malfunctions, deficiencies, and all occurrences of invalid or questionable data to the Environmental Manager; and (6) update the CEMS spare parts inventory list as needed. E&I personnel will log all activities associated with the operation of the CEMS on the corresponding data form provided in this PLAN. The routine checks and maintenance will be logged on the daily and periodic check forms. Malfunctions, repairs, and non-routine activities involving CEMS downtime will be recorded in the CEMS composition book

located in the CEMS Room. If an outside contractor is retained for any repair or audit activity E&I personnel will oversee the contracted work, assess the acceptability of the CEMS data following the repairs or audits, and ensure all work conducted by the contractor is documented according to the requirements of the PLAN. E&I personnel will maintain all PLAN documentation they generate in a central data file and will provide the Environmental Manager with any data requested.

The Plant Operators will review the emissions data periodically in the operation of the kiln and control equipment. The Plant Operators will notify the Shift Supervisor and the Environmental Manager when CEMS alarms or malfunctions, process problems, and unexplainable periods of excess emissions are encountered. If the Environmental Manager and the Shift Supervisor not immediately available the Plant Operators may call out E&I personnel directly to expedite any CEMS repairs. When process problems cause an emissions alarm the Plant Operators will fill out an EE report with the cause of the emissions excursion and the corrective action taken to resolve the problem. CEMS malfunctions will be reported to the Environmental Manager so information required for the CEMS Malfunction Report can be obtained before the CEMS alarm is acknowledged.

The Shift Supervisor will Review the Daily Report with the Plant Operator to ensure an EE report is logged for each CEMS period of excess emissions and will forward the EE report to the Environmental Manager. The Shift Supervisor will also review the CEMS daily calibration report with the Plant Operator or E&I personnel and ensure corrective action is initiated when the CEMS calibration results indicate an analyzer adjustment is needed.

The Purchasing Department will maintain the spare parts inventory as per SAP.

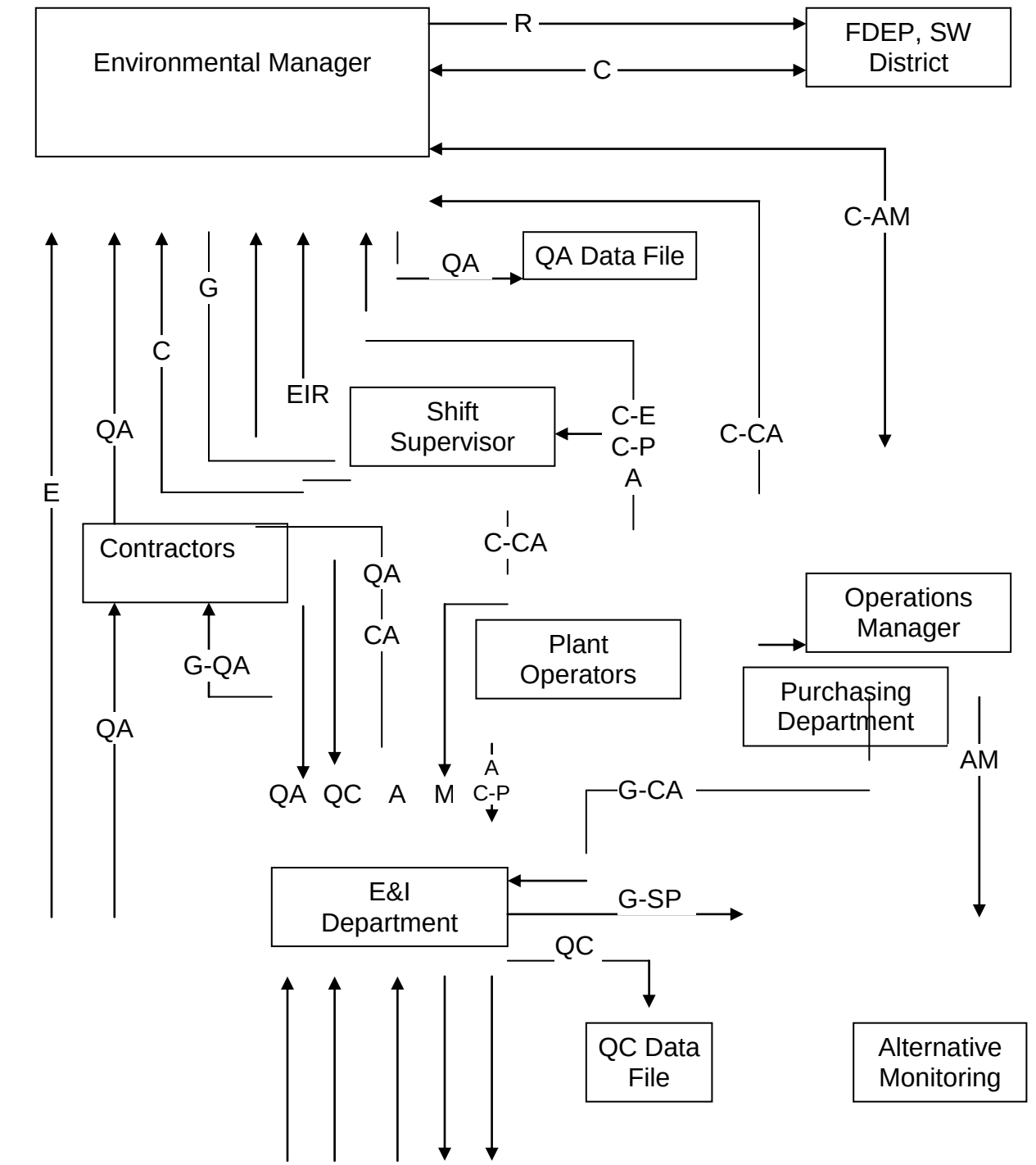
The PLAN will be implemented for an initial "shakedown" period with checks and inspections being conducted at the initial stated frequencies and contents. After the initial shakedown period, and any time the CEMS fails any QA audit specifications for two or more consecutive calendar quarters, personnel involved with the operation of the CEMS will meet to review the CEMS QA performance and discuss revisions to the PLAN. The goals of this revision are to: (1) ensure continued data accuracy and availability; (2) update the PLAN to reflect current equipment, personnel, regulations, and procedures; and (3) evaluate and revise the scope and frequencies of the preventive maintenance activities. The periodic PLAN review ensures the QA/QC program will continue to provide high CEM data quality and availability while minimizing extraneous activities and resource requirements.

Table 1.1. PLAN Implementation

Environmental Manager
• Oversee PLAN implementation. • Assess PLAN efficacy and initiate PLAN revisions. • Provide primary contact between the plant and the Agency. • Compile, review, and report quality assurance, corrective action, and emissions data. • Consult with E&I personnel when a CEMS malfunction is encountered. • Track CEMS data availability and prompt / plan alternative monitoring procedures. • Collect the Environmental Incident / Excess Emission reports.
Operations Manager
• Ensure the corrective actions are implemented in the event of a CEMS malfunction. • Plan and implement alternative monitoring procedures.
Electrical and Instrumentation Department
• Maintain the CEMS. • Evaluate daily calibration drift data. • Perform periodic QC checks. • Perform routine CEMS maintenance. • Perform or oversee performance of all CEMS repairs. • Perform or oversee performance of the periodic QA audits. • Report CEMS malfunctions to the Environmental Manager. • Report invalid or questionable data to the Environmental Manager. • Update the CEMS spare parts inventory list. • Log all QA/QC activities on the corresponding PLAN data form. • Oversee QA/QC work or maintenance performed by contractors. • Maintain all PLAN documentation they generate in a central data file. • Provide Environmental Manager with any data requested.
Plant Operator (PO)
• Notify E&I Personnel and Shift Supervisor of CEMS alarms or malfunctions, process problems, and unexplainable periods of excess emissions. • Fill out Environmental Incident / Excess Emission report. • Review daily reports with the Shift Supervisor.

Shift Supervisor (SS)
• Review Daily Report with the Plant Operators. • Ensure reason codes or written explanation is recorded for all periods of excess emissions. • Review CEMS daily calibration reports with Plant Operator or E&I personnel. • Ensure corrective action is taken based on calibration results or CEM malfunction. • Fill out Environmental Incident / Excess Emission report. • Forward the Environmental Incident / Excess Emission report to the Environmental Manager.
Purchasing Department
• Maintain spare parts inventory as directed by SAP.
Contractor(s)
• Audits and other CEM related activities as needed.

Figure 1.2 PLAN Implementation Diagram



LEGEND:

A	= Alarms
AM	= Alternative monitoring
C	= Communication
CA	= Corrective Action
E	= Emissions data
EIR	= Environmental Incident Reports
FDEP	= Florida Department of Environmental Protection
G	= Guidance / General Oversight
M	= Maintenance
P	= Process problems
QA	= Quality Assurance Data
QC	= Quality Control Data
R	= Reports
SP	= Spare Parts

2. PLANT DESCRIPTION

2.1 PROCESS DESCRIPTION

American Cement Company, LLC operates a dry process portland cement manufacturing plant which includes a coal handling system, raw feed system, kiln, cooler, finish mill, clinker and cement storage and handling systems, and a cement distribution system. The facility is a nominal 1,186,250 tons per year dry process Portland cement plant incorporating a dry process kiln with a preheater and calciner. The manufacture of Portland cement primarily involves the crushing, grinding, and blending of limestone, clays, and other raw materials into a chemically proportioned mixture which is heated in a rotary kiln to extremely high temperature to produce clinker nodules. The clinker is cold and ground with a small quantity of gypsum to produce finished cement.

2.2 EMISSIONS STANDARDS

The plant is subject to the following emissions limitations as specified in 40 CFR 60 and 40 CFR 63, Subpart LLL. Refer to current Title V permit for current emission limitations. Regulated pollutants include:

Sulfur dioxide (SO_2)
Nitrogen Oxides (NO_x)
Carbon monoxide (CO)
Volatile Organic Compounds (VOC)
Total Hydrocarbons (THC)
Mercury (Hg)
Hydrochloric Acid (HCl)
Particulate Matter (PM/PM10)

In addition to the emission limiting standards the plant is also required to monitor stack gas flow rate and stack gas oxygen concentration; and to monitor and report Greenhouse Gas emissions in accordance with the requirements of 40 CFR 98, *Mandatory Greenhouse Gas Reporting.*

2.3 SUMMARY OF MONITORING REQUIREMENTS

General monitoring requirements applicable to the facility are specified in 40 CFR 60, Appendix F, and 40 CFR 63.

In accordance with 40 CFR 60.13 the CEMS must be in continuous operation except for system breakdowns, repairs, calibration checks, and required zero and span adjustments. Data recorded during periods of CEMS breakdowns, repairs, calibration checks, and zero and span adjustments shall not be included in the data averages. Section 60.13 also specifies that the CEMS zero and span calibration drift be checked at least once daily in accordance with a written procedure, and that the zero and span be adjusted whenever the 24-hour zero drift or 24-hour span drift exceeds two times the limits of the applicable Performance Specifications in 40 CFR 60, Appendix B. For SO_2 and NO_x monitors the applicable performance specification is 40 CFR 60, Appendix B, Performance Specification 2; for O_2 and CO_2 monitors the applicable performance specification is 40 CFR 60, Appendix B, Performance Specification 3; for CO monitors the applicable performance specification is 40 CFR 60, Appendix B, Performance Specification 4; for THC monitors the applicable performance specification is 40 CFR 60, Appendix B, Performance Specification 8A; for PM CPMS monitors the applicable performance specification is 40 CFR 60, Appendix B, Performance Specification 11; for Hg monitors the applicable performance specification is 40 CFR 60, Appendix B, Performance Specification 18; and for HCl monitors the applicable performance specification is 40 CFR 60, Appendix B, Performance Specification 18.

40 CFR 60, Appendix F, Procedure 1 contains the CEMS quarterly accuracy audit requirements and specifies when the daily calibration drift check or accuracy audit data indicate the CEMS emissions data are not valid for use in demonstrating compliance with an applicable emissions standard. In Appendix F, periods of invalid emissions data caused by a failed audit or other CEMS malfunction are called out-of-control periods.

3. CEMS DESCRIPTION

3.1 GENERAL

The CEMS is designed to analyze, monitor, and record the levels of NO_X, SO_2, CO, THC, O_2, CO_2, Hg, HCl, PM (via CPMS) and gas flow from the in-line kiln/raw mill stack, and calculate the applicable emission factors for regulatory reporting and record keeping purposes.

The system consists of a stack probe, a heated sample line, specific analyzers, a sample-conditioning chiller, and DAHS (data acquisition & handling system).

A sample pump pulls the gas sample from the stack and through the analyzers. The sample transport line is heated above the sample dew point to prevent moisture from condensing inside the system prior to passing through the Thermo Environmental THC analyzer. Upon exhausting from the THC analyzer, the sample passes through a sample chiller and is then analyzed as a dry sample with the Siemens Ultramat and Oxymat analyzers for the remainder of the gaseous constituents. The PLC sends the collected CEMS data to a central, ESC supplied Data Acquisition System (DAS) located in the plant control room. The analyzers and PLC are located in a common, climate-controlled equipment shelter.

All gaseous emissions are measured on a dry basis except for Total Hydrocarbon, which is analyzed prior to the sample passing through the sample chilling moisture condenser.

Table 3 lists the individual instrument ranges and instrument serial numbers.

Table 3. CEMS Instrument Ranges and Serial Numbers.

Monitor	Make	Model	Serial Number	Range	Design
CO	Sick / Maihak	MCS100E	0711 1283	0-1500 ppm	
NO				0-1200 ppm	
SO2				0-500 ppm	
NO2				0-100 ppm	
CO2				0-20% vol	
H2O				0-20% vol	
O2				0-25% vol	
Barometric Press					
Stack Temp					
NH3				0-130 gph	Analog Input
Inlet MBH Temp				0-600 F	Analog Input
CM Inlet Temp				0-600 F	Analog Input
Dust Recycle Rate					Analog Input
Kiln Feed Rate					Analog Input

Flow	Sick / Maihak	Flowsic 100	08028562		
Opacity	Sick / Maihak	OMD-41	07368048	0-100%	
THC	EuroFID		0751030302.08	0-100 ppm	
Hg (not for compliance)	Thermo	81i	1035645923	0-50 ppm	
Hg (not for compliance)	Thermo	80i	1035645922		
HCl (not for compliance)					

Notes:

NDIR = non-dispersive infrared

FID = flame ionization detector

The CEMS probe and thermocouple (TC) are not considered major CEMS equipment, but rather components. They are included for informational reference purposes only.

3.2 CO, NO, SO2, NO2, CO2, H2O, O2 ANALYZER

The Sick / Maihak MCS 100-E analyzer is used to measure CO, NO, SO2, NO2, CO2, H2O, and O2. The Sick / Maihak MCS 100-E analyzer is a single-beam infrared photometer that works on the basis of the transmitted light measuring technique applying the single-beam dual-wavelength method and the gas filter correlation method. The measuring principle is based on the molecule-specific absorption of bands of infrared radiation. The absorbed wavelengths are characteristic to the individual gases. The dry-basis $NO_{x,}$ CO and methane measurement signals and the operational status outputs are linked and sent to the PLC.

3.3 THC ANALYZER

The EuroFID gas analyzer is a microprocessor-based flame ionization detector.

3.4 FLOW MONITOR

The Environmental Measurement Research Corporation (EMRC) model Delta P Gas Flow Monitor measures the dynamic pressure of gas flow in the stack in inches of water. It has an *in situ* sensor (a stack-mounted, S-type pitot) that utilizes differential pressure for measuring flow.

3.5 Hg ANALYZER

The mercury monitor is Thermo Fisher Scientific model 80i with a calibrator 81i system. The Hg monitor calibration per NESHAP LLL is currently not possible due to calibration gases not able to be certified by EPA. Therefore this monitor is not for NESHAP LLL compliance.

3.6 HCl ANALYZER

The analyzer is currently only required for NESHAP LLL. The monitor is install is a Thermo Fisher Scientific model but similar to Hg, calibration gas is not possible to be obtained and compliance cannot be demonstrated.

3.7 NEXUS DATA ACQUISITION & HANDLING SYSTEM (DAHS)

The data acquisition and handling system (DAHS) consists of a data controller, and a central data polling and reporting computer located in the control room. The data controller receives measurement signals from the respective analyzers and translates analog signals into data values and constructs averages. The data controller also receives the necessary status inputs from the analyzers to properly record analyzer calibrations, provide appropriate status flags to the CEMS data, and to generate alarms to alert operators of CEM problems or impending excess emissions events. The data controller transfers data values to the polling computer and receives configuration data from the polling computer. The data controller stores up to 2 weeks of CEMS data; consequently in the event the central computer goes down data recording and archiving is not affected. The data controller also receives the pertinent facility process variables to provide calculation of appropriate averages and permanent recording.

The central polling and reporting computer is located in the control room. It receives all data from the data controller, calculates the required emission units and averaging times, generates the daily calibration reports, and provides all required data recording and reporting information. Data from this computer is also used to calculate the relative accuracy test results. The computer is equipped with a tape for permanent data storage.

The NEXUS DAHS is programmed to schedule and start CEMS, COMS, and flow daily calibrations and calibration checks. Gas calibrations, with EPA Protocol gases are used for MCS100E O_2 and EuroFID THC. MCS100E calibration checks are performed with filters, calibrated to associated EPA Protocol gasses, for CO, CO_2 NO, NO_2 and SO_2. Internal checks are performed by the OMD41 for opacity, and Flowsic 100 for flow. The Thermo Model 80i mercury analyzer generates elemental mercury with Thermo Model 81i mercury generator for calibration.

Results for each are logged by the NEXUS DAHS. The results are compared "expected" to "actual" for calculation of percent accuracy. The results are logged as:

2. Pass, being within 50% of calibration range.

3. Warning, being 50% to 100% of calibration range.

4. Out of Control (OOC) being over 100% of calibration range.

5. OOC is also logged if there are four (4) consecutive warnings.

The NEXUS DAHS is monitored and corrective actions, listed below, are taken by the Environmental Manager, Control Room Operator, and/or personnel from the Electrical & Instrumentation (E & I) Department.

OOC is addressed by immediate re-calibration offailed analyzer. If failure persists required maintenance to system is performed.

The mercury analyzer is not used for compliance purposes so if a result is DOC it mayor may not be immediately re-calibrated.

Below is a table of drift ranges for each analyzer that is used for compliance purposes:

Pollutant	Drift Limit	Pass	Warning	OOC
CO	5%	0 – 2.5%	2.5 – 5%	> 5%
CO_2	0.5%	0 – 0.25%	2.5 – 0.5%	> 0.5%
H_2O	2.5%	0 – 1.25%	1.25 – 2.5%	> 2.5%
NO	2.5%	0 – 1.25%	1.25 – 2.5%	> 2.5%
NO_2	2.5%	0 – 1.25%	1.25 – 2.5%	> 2.5%
O_2	0.5%	0 – 0.25%	2.5 – 0.5%	> 0.5%
SO_2	2.5%	0 – 1.25%	1.25 – 2.5%	> 2.5%

THC	3.0%	0 – 1.5%	1.5 – 3.0%	> 3.0%
Flow	3.0%	0 – 1.5%	1.5 – 3.0%	> 3.0%
Opacity	2.0%	0 – 1.0%	1.05% - 2.0%	> 2.0%

The NEXUS DAHS records and tabulates calibration data, and records each alarm that occurs, for each analyzer and monitor.

4. CEMS CALIBRATION

4.1 CALIBRATION OF THE CEMS.

The single beam infrared filter photometer of the analyzer allows the simultaneous use of bifrequency and gas filter correlation methods. The cell is optimized for fast gas exchange and thermostatically controlled to high temperatures. A sintered metal protective filter is fitted in the sample gas inlet. An integrated flow meter triggers an alarm when the value is below the set limit value. The CEMS calibration is performed by internal calibration filters or by injecting gases of known concentration into the system and comparing the CEMS response output by the data acquisition and handling system (DAHS) with the tag value of the gas.

When the calibration gas is injected into the system at the CEMS sample probes, the gas is transported through Teflon tubing to the probes from a bank of calibration gas cylinders stored adjacent to the CEMS shelter. A sample pump in the CEMS shelter draws the calibration gas from the probe through the entire sampling system and delivers it to the Thermo Environmental THC analyzer, as a wet sample, in the CEMS shelter. The calibration gas then flows through the sample conditioning chiller and then through the remaining analyzers. The calibration gas flow is regulated to maintain the same sample flow rate as during normal CEMS operation.

Each measurement channel of the CEMS is challenged with a zero-level and a high-level calibration filter daily during the automatic routine calibration cycle. The infrared light is directed to each calibration filter for sufficient time to allow for a stable reading. The data controller records the analyzer output during the last 60 seconds of each filter and averages the data into the final calibration response. The calibration data averages are sent to the polling computer where the daily calibration drift values are calculated and compared to the applicable acceptance criteria. A calibration failure alarm is generated by the DAS if calibration drift values exceed the Appendix F out-of-control period criteria. A maintenance alarm is generated if an adjustment to the analyzer is needed.

4.2 CALIBRATION DRIFT DETERMINATION.

The CEMS DAHS initiates a routine automatic calibration cycle at least once daily and compiles the CEMS calibration data into a calibration drift (CD) report. An alarm flag is included

in the CD report if the difference between the CEMS response to any gas and the tag value of the gas exceeds the Appendix F out-of-control or 60.13 adjustment limits. A CEMS operator checks the CD reports daily to ensure the CD check results are acceptable. The operator prints a hard copy of the CD report and attaches the report to the PLAN Daily Check Form for inclusion in the CEMS QC data file.

At a minimum, the CEMS calibration is adjusted (in accordance with 60.13) when the CD exceeds two times the applicable 24-hour calibration drift limits of 40 CFR 60, Appendix B, Performance Specifications 2, 3, and 4.

4.3 CEMS CALIBRATION PROCEDURE

1. Check the calibration gas delivery pressures. The correct delivery pressure is determined independently for each CEMS installation.

2. Check the Data Controller Calibration Setup, and the Polling Computer Calibration Expected Value Info to ensure the calibration gas concentration settings match the tag values of the calibration gasses being used.

3. Note the time to the nearest second and start the manual calibration sequence by pressing the Start Cal button.

4. Press the key to display the Zero/Span menu.

   NOTES:
   - The unit goes into zero for four minutes, zero contact on for two minutes.
   - Zero adjustments can be made during the last 60 seconds of the zero adjustment cycle.
   - Choose "Zero" from the "Reset Z/S" menu.

5. Select "Zero All" to zero all the CEMS channels at one time or move the arrow keys up or down to zero each component individually.

6. After six minutes (from the beginning of the calibration sequence) unit goes into span.

4.4 CALIBRATION GAS REQUIREMENTS

The calibration standards used for the daily calibration drift check are performed with the internal filter calibrant.

Optionally, the drift can be checked with a calibration gas that must be certified for accuracy. At a minimum, the certification must be traceable to the gas manufacturer's intermediate standard gas. Documentation of the calibration gas certification must be kept in the CEMS data file. The calibration gas concentrations must be chosen in accordance with the specifications listed in Table 4.1.

Table 4.1. Calibration Gas Concentrations Used for the Daily Calibration Check

CEMS Channel	CEMS Span Value	Zero Value (tag value)	Span Value (tag value)
CO	1000 ppm	0 - 200 ppm	500 - 1000 ppm
SO_2	100 ppm	0 - 20 ppm	50 - 100 ppm
NO_x	500 ppm	0 - 100 ppm	250 - 500 ppm
CH_4	100 ppm	0 - 20 ppm	50 – 90 ppm
THC	100 ppm	0 - 20 ppm	50 - 90 ppm
O_2	21 %	0 - 4 % O_2	10.5 - 21 O_2%
CO_2	18%	0 – 4.5 %	9 – 18 %

5. PREVENTATIVE MAINTENANCE

The following quality assessment (QA) and quality control (QC) procedures will be used to maintain and document CEMS performance.

The QA procedures include the daily calibration drift check. This QA check is mandatory. In accordance with Appendix F the calibration drift check must be conducted daily and the CEMS must meet the applicable performance criteria or the CEMS is out-of-control. When a missing or failed calibration drift check triggers an out-of-control period corrective actions must be initiated and the procedure must be repeated until acceptable CEM performance is achieved. Data collected during out-of-control periods may not be used in the emissions data averages and will not count toward any applicable data availability requirements. Additional QA procedures used to audit the CEMS on a periodic basis are outlined in PLAN Section 6.

The QC procedures include routine maintenance and inspection activities developed by the CEMS operators. These procedures are used to support the QA activities and to minimize unexpected CEM failures.

A data form is provided for each set of QC procedures. The data forms are structured as checklists to ensure the QC procedures are fully implemented in the most time-effective manner possible. Personnel conducting the checks will fully complete each item on the applicable form and provide comments regarding CEM failures, repairs, trends, and performance. Periods when the CEM is taken out-of-service for routine maintenance will be logged on the appropriate checklist containing the maintenance item. The Corrective Actions Data Form provided in Section 7 is used to log downtime caused by repairs, failures, and all non-routine maintenance.

Data recorded during periods of CEMS breakdowns, repairs, calibration checks, and zero and span adjustments must not be included in the emissions data averages. Personnel conducting any maintenance that requires taking the CEMS off-line by going into the Data Controller (7560) and from the main page select (C) Configuration, then (D) Configure Data Channels, then (I) put channel in Maintenance, and must remember to select (O) for Take channel out of Maintenance when the maintenance procedures are complete.

5.1 DAILY CHECKS AND CALIBRATION DRIFT CHECK

E&I personnel perform daily inspections of the CEMS, except Hg-CEMS, COMS, and flow monitoring systems. The inspections made by E&I personnel and data gathered are entered on the CEMS Daily Inspection Sheet (Form 5-1A) and recorded in the CEMS notebook. The CEMS Daily Inspection Sheet includes:

- Compressed air supply pressure
- Refrigerant dryer (Ingersoll brand Model D31NC) suction pressure
- Desiccant color (blue or pink)
- MSC100E flow
- MSC100E energy
- MSC100E monitored oxygen content (%)
- MSC100E kiln feed rate (kiln operating vs. oxygen accuracy)
    - Oxygen < 17%: should have kiln running
    - Oxygen ? 17%: kiln should be down
- Compressed air supply pressure to:
    - Zero-gas
    - Instrument air
    - Control air
    - Blow-back air
- Flowsic 100 operating mode is noted
- OMD-41 opacity % and any errors shown noted
- Cylinder pressures of gases used for MSC100E daily gas calibrations are read and noted:
    - CEMS grade nitrogen
        - Pressure to MCS100E
        - Cylinder pressure
    - Oxygen (2.1%, balance nitrogen)
        - Pressure to MCS100E
        - Cylinder pressure
- Cylinder pressure of gas used for EuroFID daily gas calibration are read and noted:

  - Propane (~90% span, balance air)
    - Pressure to EuroFID
    - Cylinder pressure
- Cylinder pressures of gas used for EUroFID flame are read and noted:
  - Ultra-high-purity hydrogen
    - Pressure to EUroFID
    - Cylinder pressures (2 each)

E&I personnel take the following actions at specific cylinder pressure readings:

- Change calibration cylinders when cylinder pressure is between 250 and 300 psig.
- Change EuroFID hydrogen cylinders when cylinders reach 500 psig.
- Complete the "CEMS Gas Cylinder Change-out log".
- Submit the completed "CEMS Gas Cylinder Change-out log" to the Environmental Manager.
- Environmental Manager adjusts actual gas calibration concentration in NEXUS DAHS when the oxygen cylinder or propane cylinder for daily calibration cylinders is changed.

E&I personnel take the following actions if a problem is noted with CEMS during inspection:

- If low air pressure contact Control Room Operator to verify that all compressors are operating.
- If oxygen level is high with kiln operating, check probe for vacuum leak.
- Contact Environmental Manager for further actions including, but not limited to, contacting Sick, or CEMTEK, for telephone assistance or request for onsite work.

E&I personnel, Environmental Manager, and CEMS repair contractor shall make note of any work or adjustments completed on MCSlOOE, Flowsic 100, and OMD-41 in the CEMS logbook in the CEMS Room.

E&I personnel perform daily inspections of the Hg-CEMS. The inspections made by E&I personnel and data gathered are entered on "Hg-CEMS Daily Inspection Sheet".

- "Hg-CEMS Daily Inspection Sheet" includes:
  - Compressed air supply pressure
  - Operating air pressures after scrubbing and drying
  - Desiccant color (blue or pink)
  - Purafil color (purple or brown)
  - Alarms indicated on Model 80i Analyzer
  - Alarms indicated on Model 81i Mercury Generator

E&I personnel take the following actions if a problem is noted with Hg-CEMS:

- If low air pressure check system for possible plugged air filter.
- If desiccant is not blue, then change with dry desiccant
- If Purafil is not purple, then change with fresh Purafil.
- Check 80i or 81i panels for specific alarms and address if possible.
- Contact Environmental Manager for further actions including, but not limited to contacting Thermo Fisher Environmental, or CEMTEK for telephone assistance or request for onsite work.

E&I personnel, Environmental Manager, and CEMS repair contractor shall make note of any work or adjustments completed on Thermo Model 80i, 81i, 82i, or 83i in the Hg-CEMS Logbook in the CEMS Room.

EPA Protocol gases used for daily calibrations are:

- Low range (for O_2)
- Span range (for THC)

Ambient air is used for:

- Span range O_2

Clean, dry compressed air is used for:

- Zero for THC

CEMS grade nitrogen is used for zero gas environment for MCS100E filter calibration checks for CO, CO_2, NO, NO_2, and SO_2. MSC1000E span filters, with internal calibration factors set with EPA Protocol gases, are used for those pollutants.

5.1.1 Control Room Data Acquisition System (DAS) Location

- Review the General Daily Calibration Report. From the E-DAS Menu choose: Report>Calibration Reports->General Daily Calibration Report. Examine the printout for excessive calibration drift (CD) values and the presence of any CD flags. Initiate corrective action **immediately** upon discovery of an out-of-specification CD test result.

  Specification: Reference Table 5.1.

Table 5.1. Daily Calibration Drift Specifications

CD specifications expressed as a concentration. (CEMS response - reference)				
CEMS Channel	CEMS Span Value	Adjust at CD > x (for any 1-day)	Out-of-control at CD > x (for 5 consecutive days)	Out-of-control at CD > x (for any 1-day)
CO	1500 ppm	x = 75 ppm	x = 75 ppm	x = 300 ppm
SO_2	500 ppm	x = 25 ppm	x = 25 ppm	x = 100 ppm
NO_x	500 ppm	x = 25 ppm	x = 25 ppm	x = 50 ppm
CH_4	100 ppm	x = 6 ppm	x = 6 ppm	x = 12 ppm
THC	50 ppm	x = 2.5 ppm	x = 2.5 ppm	x = 10 ppm
HG	50 ug/m3	x = 2.5 ug/m3	x = 2.5 ug/m3	x = 10 ug/m3
O_2	21 %	x = 1.0% O_2	x = 1.0% O_2	x = 2.0% O_2
CD specifications expressed as a % of instrument span. ((CEMS response - reference) / instrument span) x 100				
CEMS Channel	CEMS Span Value	Adjust at CD > x (for any 1-day)	Out-of-control at CD > x (for 5 consecutive days)	Out-of-control at CD > x (for any 1-day)
CO	--	x =10.0%	x = 10.0%	x = 20.0%
SO_2	--	x = 5.0%	x = 5.0%	x = 10.0%
NO_x	--	x = 5.0%	x = 5.0%	x = 10.0%

CH_4	--	x = 6.0%	x = 6.0%	x = 12.0%
THC	--	x = 6.0%	x = 6.0%	x = 12.0%
HG		X = 5.0%	X = 5.0%	X = 20.0%
O_2		x = 1.0%	x = 1.0%	x = 2.0%

The CEMS must be adjusted when the daily CD results exceed the "Adjust at CD > x" specifications listed in Table 5.1. The CEMS is out-of-control if the CEMS CD exceeds the "Out-of-control at CD > x" specification listed in Table 5.1. Emissions data collected during the out-of-control period are not valid for use in demonstrating compliance with an emissions standard and may not be counted toward the minimum data availability requirement. When the O_2 channel used to correct pollutant emission concentrations to 7% O_2 is out-of-control, all data dependent on the O_2 measurement are invalid until quality assured O_2 data can be provided. Reference PLAN Section 7.2 for additional information regarding out-of-control periods.

- Adjustment of Zero and Span for specific corrective action procedures. The out-of-control criteria does not apply if the excessive calibration drift is caused by a malfunction of the calibration gas delivery system (stuck valve, empty calibration gas bottle, etc.) and a subsequent successful CD check can be accomplished for that day without making any adjustments or repairs to the CEMS. However, due to the DAHS automatic zero adjustment performed during each calibration sequence, the emissions data collected between completion of the unsuccessful daily CD check and the subsequent successful calibration may be invalid. The CEMS operator should carefully consider the cause of the initial CD failure to determine if the emissions data are affected, and must flag all periods of invalid data for exclusion from the CEMS emissions data averages.

- The General Daily Calibration Report is sent by email to the Plant Manager.

5.1.2 CEMS Enclosure

- Check instruments for alarms. Access the Readings With Flags screen at Polling Computer (Main Menu -> Real Time Display -> Readings With Flags). Check to make sure that the data is **not** flagged.
- Record Calibration Drift for zero and span.
- Check temperature controllers. From the "Main Menu" at the Polling Computer access the "Diagnostic" and then the "Temperatures" screen. Verify that there are no alarms or errors indicated in the right-hand column of the display.
- Check and record system sample flow.
- Check calibration gas pressures. Check the pressure readings on each gas bottle regulator. The high pressure gauge (0-2000) shows the pressure inside the bottle; this pressure should be greater than 200 psi. The bottle should be replaced if the pressure drops below 200 psi. The low pressure gauge shows the delivery pressure of the gas as it goes to the CEMS. All of the delivery pressures on the system should be set at 40 psi.

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5.1.2.1 Calibration Gas Bottle Replacement

- Install the new cylinder
- Record the calibration gas cylinder number and the tag value of the gas in the comments section of the Daily Check Form.
- Update the DAHS with the tag value of the new calibration gas.

Whenever a calibration gas bottle is replaced, the new tag value of the gas MUST be updated at the following locations in the CEMS data acquisition system:

1. Setup" in the Polling Computer. This value is used to alarm calibration The "Calibration failures.

2. The "Ref Value" in the DAHS software. This value is used to calculate the calibration drift results

- An automatic calibration of the CEM may be initiated to ensure the resulting calibration drift values are acceptable. If the response of the CEM to a new calibration gas is

unacceptable, recheck the reference values programmed into the DAHS. If there is no reason to suspect a CEM malfunction and the reference values programmed into the DAHS are correct, the cause of the error may be an improperly analyzed gas bottle.

5.1.3 On-Stack Sampling location

- No checks required.

5.1.4 Final Checks and Adjustments

- Update CEMS DAHS with new calibration gas tag values. This step is necessary only if a calibration gas bottle has been replaced since the last daily calibration drift check.

Figure 5-1A CEMS Daily Inspection Sheet

CEMS DAILY INSPECTION SHEET Date_____

Revision 11, 12-16-2015

INSPECTOR_____/_____

PRINT SIGNATURE

Inlet Air Pressure_____(minimum 80 psi) Dryer Suction Pressure_____(0 to 50 psi)

Desiccant Changed_____ NOT Changed_____

MCS100E Flow_____(min. 140 l/h) **Energy** _____(min.60%)

MCS100E O2%_____(<17% running) Kiln Feed_____(>15 TPH = running)

CEMS Air Pressure 1(east):_____ (minimum 100 psi [supply])

CEMS Air Pressure 2 (center):_____ (60 – 65 psi)

CEMS Air Pressure 3 (west):_____ (45 – 50 psi)

Flowsic 100: ____ Operation ____ Malfunction ____ Maintenance ____ Check Cycle

OMD41: _____% Opacity _____Error Message

HYDROGEN:

Pressure to FID:_____ (set at 50 psi)

Pressure Available_____ (minimum 500 psi)

Pressure Cylinder (east):_____ (minimum 500 psi)

Pressure Cylinder (west):_____ (minimum 500 psi)

CEMS Grade Nitrogen: Cylinder No._____

Pressure to CEMS:_____ (min. 40 psi)

Cylinder Pressure:_____ (minimum 300 psi)

Propane 45 ppm: Cylinder No._____

Pressure to CEMS:_____ (**min. 50 psi**)

Cylinder Pressure:_____ (minimum 300 psi)

Oxygen 2.1%: Cylinder No._____

Pressure to CEMS:_____ (min. 40 psi)

Cylinder Pressure:_____ (minimum 300 psi)

5.2 WEEKLY CHECKS AND MAINTENANCE

Record the results of the weekly QC checks in the CEMS Logbook. Add comments regarding the observed condition of the CEMS as needed and initiate corrective actions when unacceptable CEMS performance is detected.

- Enter the date, time, and the initials of the person conducting the weekly checks on the Weekly Preventive Maintenance Check List.
- Check tubing downstream of sample conditioner for moisture. Remove and dry as necessary. Investigate sample conditioner for proper operation.
- Check Opacity Monitor On Stack and Clean Lenses.
- Check Flow Monitor On Stack And Check Plant Air Pressure At Flow Monitor. (80 psi).
- Check all filters (Blower, air conditioner, sample system, etc). Replace as necessary (usually every 2-3 months).
- Verify sample line heater operation

5.2.1 Data Acquisition and Handling System (DAHS) Location

- Investigate all alarms.
- Confirm values consistent with plant operations

5.2.2 Gas CEMS Enclosure

- Visually inspect sample system for contamination and proper operation. Inspect the sample line downstream of the sample conditioner for moisture.
- Verify sample line heater operation.

5.2.3 On-Stack Sampling location

- Check flow monitor and confirm plant air pressure at monitor – should be 80 psi.

5.3 QUARTERLY CHECKS AND MAINTENANCE

Quarterly checks and adjustments will be conducted under a maintenance contract with a qualified CEMS service company. The results of the quarterly checks will be recorded in the CEM Maintenance Log. Before initiating the quarterly checks the maintenance technician should inform the Plant Operator that scheduled CEM maintenance is being conducted and that unusual CEM measurements may occur periodically during the maintenance interval. At a minimum, the quarterly maintenance will include the following:

5.3.1 SAMPLE SYSTEM

- Inspect/replace sample pump diaphragm.
  Replace every 6 months.
- Inspect/replace sample pump valve plate.
  Replace every 6 months.
- Verify appropriate response time of CEM system.
  Address as needed.

5.3.2 SYSTEM ANALYZERS

- Review Daily & Monthly calibration reports for drift.
  Address as needed.
- Review quarterly CGA results.
  Address as needed.

COMS Opacity Lens Filter Audit (40 CFR Part 60, Appendix B, PS1) performed in four (4) calendar quarters of the year. This audit is performed with a Sick Maihak OMD41 Opacity Audit Filter Set that is certified annually by Opacity Certification Services, LLC. The filters are:

- S/N F14A (7.5% opacity)
- S/N F15A (15.4% opacity)
- S/N F16A (33.2% opacity)

Mercury Linearity Test (40 CFR Part 75, Appendix A) performed in four (4) calendar quarters of the year. The test is performed using an elemental mercury calibration source (Thermo Model 81i) with gas values in low, mid, and high span range.

Mercury 3-Level lntegrity Check (40 CFR Part 75, Appendix A) performed in four (4) calendar quarters of the year. This check is performed using an oxidized source of mercury (HgCI2) with gas values in low, mid, and high span range.

5.4 ANNUAL CHECKS AND MAINTENANCE

Annual checks and adjustments should be conducted under a maintenance contract with a qualified CEMS service company. The results of the annual checks will be recorded in the CEM Maintenance Log. Before initiating the annual checks the maintenance technician should inform the Plant Operator that scheduled CEM maintenance is being conducted and that unusual CEM measurements may occur periodically during the maintenance interval. At a minimum, the annual maintenance will include the following:

SAMPLE SYSTEM

- Inspect/replace probe tip and internal filters.
  Replace/exchange as needed.
- Inspect/replace heated flow meter Gaskets.
  Replace annually.
- Inspect/clean sampling system components.

SYSTEM ANALYZERS

- Perform per manufacturers recommendations.
  Address as needed.

QA/QC PLAN

- Review spare parts inventory - submit recommendations.
- Review annual QA/QC Plan for corrective action modifications.

6. ACCURACY AUDIT PROCEDURES

An accuracy audit must be conducted at least once during each calendar quarter in accordance with the requirements of Appendix F. Cylinder gas audits (CGAs) may be conducted in three out of four calendar quarters, but in no more than three quarters in succession. This is performed for O_2, CO_2, CO, NO, NO_2, SO_2, and THC at mid and low range of span. A relative accuracy test audit (RATA) must be conducted at least once per year and suffices for one of the four calendar quarter audits. Successive quarterly audits must not occur closer than two months apart.

The CGAs are conducted according to the procedures of Appendix F. Cylinder gases used for the CGA must be analyzed according to EPA Protocol 1. The RATA is conducted according to the specifications of Appendix F and the applicable test procedures of 40 CFR 60, Appendix B, Performance Specifications.

6.1 CYLINDER GAS AUDIT

- Enter the date, time, and the initials of the personnel conducting the CGA on the CEMS log.

- Inform the Plant Operator(s) that CEM auditing procedures are being conducted and that unusual pollutant and diluent values will be encountered until the audit is complete.

- Ensure that the pressure in each audit gas cylinder is sufficient to complete the CGA (a minimum of 500 psi is generally required).

- Record the audit cylinder gas values (certified by the gas vendor according to EPA Protocol 1 procedures) and cylinder identification numbers on the CGA Data Form. The gas concentrations must be chosen according to the following Appendix F requirements:

CEMS Channel	Span Value	Low-Level Gas (20-30% of span)	High-Level Gas (50 - 60 % of span)
CO	1000 ppm	200 - 300 ppm	500 - 600 ppm

SO_2	100 ppm	20 - 30 ppm	50 - 60 ppm
NO_x	500 ppm	100 - 150 ppm	250 - 300 ppm
CH_4	100 ppm	20 - 30 ppm	50 - 60 ppm
THC	100 ppm	20 - 30 ppm	50 - 60 ppm
O_2	21%	4 - 6 % O_2	8 - 12 % O_2

- Configure the DAS to record short-term data averages or use the ESC QA/QC Test utility to collect the CGA data. Ensure that the CEM data collected during the CGA are not included in the effluent emissions data averages.

- Configure the CEMS to accept the audit gasses. Note that the CEMS must be operated in its normal sampling mode while passing the audit gasses through all filters, scrubbers, conditioners, and other monitor components used during normal sampling. Include as much of the sampling probe as is practical.

- Adjust the audit gas delivery pressure and flow rate to provide an adequate flow of audit gas to the CEM probe. The audit gas flow rate to the CEM probe must be balanced with the CEM sampling rate. Both insufficient and excessive audit gas flow to the probe may adversely affect the CGA results.

- Flow the low- and high-level audit gases three times each in non-consecutive order such that a stable response is clearly recorded by the DAS for each gas injection.

- Retrieve the audit data from the DAS and calculate the audit results.

The SO_2, NO_x, THC, CH_4, O_2 and CO CEM is out-of-control if either the low- or high-level audit results exceed 15 percent of the reference value of the gas or 5 ppm; the pollutant channel of the CEM passes the CGA if either of the applicable criteria are met. The O_2 monitor is out-of-control if either the low- or high-level audit results exceed 15 percent of the reference value of the gas. Reference PLAN Section 7.2 for additional information regarding out-of-control periods.

- If the CEMS is out-of-control, initiate corrective action and repeat the audit for the monitor that failed to meet the CGA criteria. Repeat this process until all of the CGA results are acceptable.

- If any of the audit results triggered an out-of-control period, check the results of the CGA or RATA conducted during the previous calendar quarter. Whenever the CEMS fails an accuracy audit during two consecutive calendar quarters the source owner or operator must revise the PLAN or repair or replace the monitoring system.

- Return the CEMS to the normal sampling mode following completion of a successful CGA.

- Record the time when the gas CEMS audit is completed on the CEMS log.

6.2 RELATIVE ACCURACY TEST AUDIT

- Inform the Plant Operator(s) that CEM auditing procedures are being conducted and that stable unit operation will assist in achieving acceptable audit results.

- Conduct the RATA according to the requirements of Appendix F using the relative accuracy test audit procedures of 40 CFR 60, Appendix B, Performance Specification 6.

  Conduct a minimum of nine test runs.

  The sample time for each test run must be at least 21-minutes.
  Conduct a 3-point traverse of the stack during each run. Select the traverse points according to Section 3.2 in Performance Specification 2. Sample time at each traverse point should be evenly spaced over the period of the test run.

  More than nine test runs may be conducted. A maximum of three test runs may be rejected as long as the results from at least nine test runs are used to calculate the relative accuracy test results. All test data must be reported, including the data collected during any rejected test runs.

  Calculate the test results relative to the mean reference method test value and/or relative to the applicable emissions standard.

  Individually evaluated, SO_2, NO_x, THC, CH_4 and CO CEMS are out-of-control if the test result exceeds both 20 percent relative to the mean reference method test value, or 10 percent relative to the applicable emission standard. If the CEMS pass either of the above specifications, it is not out of control.

- If the CEMS is out-of-control, take the appropriate corrective action and repeat the RATA. An out-of-control period resulting from a RATA must always be terminated by a subsequent successful RATA.

- If the RATA triggers an out-of-control period, check the results of the CGA or RATA conducted during the previous calendar quarter. Whenever inaccuracies occur for two consecutive calendar quarters the source owner or operator must revise the QC procedures or repair or replace the monitoring system.

RATAs are to be performed one (1) time per year with data used for the fourth quarter CEMS CGA. The test run data for the RATA is also use to verify operational compliance with Title V permit limits. The operating rate during the test runs must be 90% to 100% of Title V permit production limit. The CEMS units' RATA are performed by the test methods listed for each:

- Oxygen (O_2) (EPA Test Method 3A)
- Carbon Dioxide (CO_2) (EPA Test Method 3A)
- Carbon Monoxide (CO) (EPA Test Method 10)
- Nitric OXide (NO) (EPA Test Method 7E)
- Nitric Oxides (NO_2) (EPA Test Method 7E)
- Sulfur Dioxide (SO_2) (EPA Test Method 6C)
- Total Hydrocarbon (THC) (EPA Test Method 25A)

7. CORRECTIVE ACTIONS

Corrective actions include repairs and unscheduled maintenance conducted in response to an impending or acute monitor malfunction. The corrective action instructions in this manual focus on procedures used to log the occurrence of unacceptable CEM performance. The CEM system manuals should be consulted for detailed troubleshooting and repair procedures.

The cause of the malfunction, the repair procedures used to place the CEM back in service, the use of spare parts removed from the on-site spare parts inventory, and specific periods of invalid data should be clearly recorded on the Corrective Actions Data Form provided at the end of this section. It is particularly important to log the date, time (start and end), and cause of all periods when the CEM data is not valid for use in compiling emissions reports to the Agency. Uncertainty regarding the status and validity of the CEMS data for even short periods of time may severely complicate the periodic reporting process.

The most common event that will require corrective action is an out-of-control period triggered by a failed calibration drift check or accuracy audit of the CEMS. A definition of out-of-control periods is provided in Section 7.2.

7.1 LOGGING CORRECTIVE ACTION INFORMATION

- Enter the date, and the name of the person conducting the corrective actions on the CEMS log sheet.
- Record the component being serviced and the reason for the maintenance being performed.
- Record the time the CEMS was taken out of service for maintenance.
- Determine if any invalid CEMS data was recorded by the DAHS before the CEMS was taken out of service for maintenance or repairs. Attempt to determine the time at which any invalid CEMS data was recorded and note this information in the comments section of the CEMS log.
- Describe the corrective action taken to return the CEM to service. Include a list of any spare parts removed from the spare parts inventory.
- Note the condition of the CEM following the repair procedures.
- Record the time the CEMS was returned to service.

7.2 APPENDIX F OUT-OF-CONTROL PERIODS

The monitoring system is out-of-control when the daily calibration drift or periodic accuracy audit results exceed specific CEM performance criteria defined in 40 CFR 60, Appendix F. Appendix F is reprinted in Appendix C of this PLAN. Corrective action must be initiated upon identification of an out-of-control period and the check or audit that triggered the out-of-control period must be repeated until acceptable CEM performance is obtained. CEM data collected during the out-of-control period may not be used to demonstrate compliance with an emissions standard and does not count toward meeting any minimum data availability requirements. When the O_2 channel used to correct the THC and CH_4 emission concentration to 7% O_2 is out-of-control, all data dependent on the O_2 measurement are invalid until quality assured O_2 data can be collected.

7.2.1 Out-Of-Control Period: Calibration Drift

A CEMS channel is out-of-control if the calibration drift (CD) check results for that channel exceed "x = " values listed under the "Out-of-control at CD > x" heading in Table 7.1.

Table 7.1. Daily Calibration Drift Specifications

CD specifications expressed as a concentration. (CEMS response - reference)				
CEMS Channel	CEMS Span Value	Adjust at CD > x (for any 1-day)	Out-of-control at CD > x (for 5 consecutive days)	Out-of-control at CD > x (for any 1-day)
CO	1000 ppm	x = 100 ppm	x = 100 ppm	x = 200 ppm
SO_2	100 ppm	x = 5 ppm	x = 5 ppm	x = 10 ppm
NO_x	500 ppm	x = 25 ppm	x = 25 ppm	x = 50 ppm
CH_4	100 ppm	x = 6 ppm	x = 6 ppm	x = 12 ppm
THC	100 ppm	x = 6 ppm	x = 6 ppm	x = 12 ppm
O_2	21 %	x = 1.0% O_2	x = 1.0% O_2	x = 2.0% O_2
CD specifications expressed as a % of instrument span. ((CEMS response - reference) / instrument span) x 100				
CEMS Channel	CEMS Span Value	Adjust at CD > x (for any 1-day)	Out-of-control at CD > x (for 5 consecutive days)	Out-of-control at CD > x (for any 1-day)
CO	--	x =10.0%	x = 10.0%	x = 20.0%
SO_2	--	x = 5.0%	x = 5.0%	x = 10.0%
NO_x	--	x = 5.0%	x = 5.0%	x = 10.0%
CH_4	--	x = 6.0%	x = 6.0%	x = 12.0%
THC	--	x = 6.0%	x = 6.0%	x = 12.0%
O_2		x = 1.0%	x = 1.0%	x = 2.0%

The specifications in the top half of the table are expressed as a concentration calculated from the span value of the CEMS channel at the time this PLAN was written. This specification should be compared to the difference between the CEMS CD response and the reference value assigned to the calibration gas. Equivalent generic specifications expressed as a percentage of the instrument span are listed in the bottom half of the table. These specifications should be used in conjunction with the span value currently assigned to the CEMS channel in question to confirm that the specification expressed as a concentration is still valid.

If the CD exceeds the applicable "x" value listed under "Adjust at CD > x (for any 1-day)," the CEMS must be adjusted, however the CEMS is not out-of-control until the specification has been exceeded for 5 consecutive days.

If the CD exceeds the applicable "x" value listed under "Out-of-control at CD > x (for 5 consecutive days)" for 5 consecutive days the CEMS is out-of-control. This out-of-control period begins with the completion of the fifth consecutive unacceptable calibration drift check. The out-of-control period ends with the completion of a calibration drift check following corrective action that results in the calibration drift at both the zero- and high-level measurement points being within the applicable specification listed.

If the CD exceeds the applicable "x" value listed under "Out-of-control at CD > x (for any 1-day)," the out-of-control period begins with the completion of the calibration drift check preceding the calibration drift check in excess of the specification, i.e., starts at the completion of the last valid daily calibration. The out-of-control period ends with the completion of a calibration drift check following corrective action that results in the calibration drift at both the zero- and high-level measurement points being within the CD specification that triggered the out-of-control period.

The out-of-control criteria does not apply if the excessive calibration drift is caused by a malfunction of the calibration gas delivery system (stuck valve , empty calibration gas bottle, etc.) and a subsequent successful CD check can be accomplished for that day without making any adjustments or repairs to the CEMS. However, due to the DAS automatic zero adjustment performed during each calibration sequence, the emissions data collected between completion of the unsuccessful daily CD check and the subsequent successful calibration may be invalid. The CEMS operator should carefully consider the cause of the initial CD failure to determine if the emissions data are affected, and must flag all periods of invalid data for exclusion from the CEMS emissions data averages.

Note that the THC and CH_4 emissions data are automatically made invalid whenever the O_2 analyzer used to convert these pollutant concentrations to units of the emissions limit is out-of-control. This is because CEM data availability is determined from data expressed in terms of the emissions limit ($ppm_d@7\%O_2$) and valid, quality assured data collected concurrently from both the pollutant and the diluent channels of the CEMS are needed to calculate these data averages.

7.2.2 Out-Of-Control Period: Cylinder Gas Audit

SO_2, NO_x, THC, CH_4 and CO CEMS is out-of-control if either the low- or high-level CGA results exceed 15 percent of the reference value of the gas or 5 ppm; the pollutant channel of the

CEM passes the CGA if either of these criteria are met. For O_2 monitors the applicable specification is 15 percent of the reference value of the gas.

The beginning of an out-of-control period resulting from a failed CGA is the time corresponding to completion of the sampling for the failed CGA. The end of the out-of-control period is the time corresponding to the completion of the sampling for the subsequent successful audit.

Note that the THC and CH_4 emissions data are automatically made invalid whenever the O_2 analyzer used to convert these pollutant concentrations to units of the emissions limit is out-of-control. This is because CEM data availability is determined from data expressed in terms of the emissions limit ($ppm_d@7\%O_2$) and valid, quality assured data collected concurrently from both the pollutant and the diluent channels of the CEMS are needed to calculate these data averages.

7.2.3 Out-Of-Control Period: Relative Accuracy Test Audit

The Individually evaluated, SO_2, NO_x, THC, CH_4 and CO CEMS are out-of-control if the test result exceeds both 20 percent relative to the mean reference method test value, and 10 percent relative to the applicable emission standard. If the CEMS pass either of the above specifications, it is not out of control.

The beginning of an out-of-control period resulting from a RATA is the time corresponding to completion of the sampling for the failed RATA. The end of the out-of-control period is the time corresponding to the completion of the sampling for the subsequent successful RATA. An out-of-control period resulting from a RATA must always be terminated by a subsequent successful RATA.

7.3 SPARE PARTS INVENTORY

The CEMS spare parts inventory will be maintained by the Electrical and Instrumentation (E&I) and the Purchasing departments. Electrical and Instrumentation personnel will compile a list of the spare parts needed to maintain the CEMS. The list should include the preferred item vendor and the minimum and maximum number of each item to be kept on-site. Purchasing will order the spare parts listed and will track how many of each item remains in the inventory as parts are used. When the quantity of any item in the inventory falls to the minimum level specified, Purchasing will order enough replacement items to replenish the inventory up to the maximum

number of items to be kept on-site. The E&I department will revise the spare parts list as needed and submit the revised list to Purchasing. The current spare parts list is reprinted in Appendix I to this PLAN.

7.4 DOCUMENT REVISION AND CONTROL

Whenever a quarterly audit of the gas CEMS results in an out-of-control period for two successive calendar quarters the PLAN must be revised or the CEM must be modified or replaced (reference 40 CFR 60, Appendix F, Section 3). Even if revision is not required due to a failed audit the PLAN should always be maintained as a dynamic document. While it is essential to fully implement the PLAN as written, it is equally vital to review and revise the PLAN on a regular basis. Personnel involved with the PLAN should meet to discuss the effectiveness of specific PLAN activities and compile a list of revisions intended to enhance efficient implementation of the QA program. The Environmental Manager should oversee revision of the written document to ensure the changes will not conflict with regulatory requirements or interfere with achieving program goals. Once revised, all copies of the obsolete PLAN should be collected to prevent confusion regarding current implementation procedures.

Personnel involved with the PLAN are encouraged to record new ideas regarding PLAN improvements as they arise and add this information to the central data file for use in future PLAN revisions. Any medium can be used as long as the information is readily available for the revision process.

8. DATA RECORDING, CALCULATIONS, AND REPORTING

8.1 DATA RECORDING

The emissions data averages and the daily calibration drift data are compiled automatically by the ESC data acquisition and handling system (DAHS). Hourly average sulfur dioxide (SO_2), nitrogen oxides (NO_x), methane (CH_4) and carbon monoxide (CO) emissions data are recorded in parts per million by volume, dry-basis (ppm_{vd}). Hourly average effluent oxygen (O_2) concentrations are recorded in percent O_2. Hourly total hydrocarbon (THC) ppm@7%O_2, lb/hr and lb/ton clinker are calculated from the hourly pollutant ppm, stack gas flow and hourly O_2 averages.

The DAHS compiles the hourly average SO_2, NO_x, THC, CH_4 and CO emissions data into 24-hour daily average emission rates and applicable process ratios and with EPA Reference Method 19, Sections 4.1, 4.3 and 5.4, as applicable. Based on the NESHAP LLL definitions of startup and shutdown, data during those periods is excluded from CMS data used to determine NESHAP LLL compliance, (THC, HCl, PM-CPMS, Hg).

Completion of the preventative maintenance procedures, assessments of the daily calibration drift results, the results of the quarterly accuracy audits, identification of out-of-control periods, and information regarding corrective actions are documented on the applicable data forms.

8.2 CALCULATIONS

8.2.1 THC and CH_4 emissions data are corrected to 7% O_2.

The THC and CH_4 emissions data are corrected to 7% O_2 by the DAS according to the following formula:

$$E_h = \frac{(20.9 - 7)}{(20.9 - O_2)} C_d$$

Where:

E_h = Pollutant concentration in units of the emissions standard (ppm_{vd} @ 7% O_2).

C_d = Pollutant concentration in ppm_{vd}.

O_2 = O_2 concentration in percent.

8.2.2 Average Pollutant Rates from Hourly Values

$$E_a = \frac{1}{H}\sum_{j=1}^{n} E_{hj}$$

The average pollutant rate (E_a) is computed using the following equation:

where:

E_a = The average pollutant rate for the specified period.

E_h = The hourly average pollutant concentration.

H = The total number of operating hours for which pollutant rates are determined.

8.2.3 Daily Calibration Drift

The SO_2, NO_x, THC, CH_4 and CO daily calibration drift check results are calculated relative to the instrument full scale span according to:

CD = ((CEMS Response - Calibration Gas Value) / Instrument Span) X 100

The calibration drift check results for the O_2 analyzer are calculated in percent O_2 according to:

CD = CEMS Response - Calibration Gas Value

8.2.4 CEMS Accuracy by CGA:

The cylinder gas audit results are calculated according to:

$$A = \left[\frac{C_m - C_a}{C_a} \right] \times 100$$

Where:

A = Percent accuracy.

C_m = The average CEMS response to each gas.

C_a = The certified concentration of the audit gas.

8.2.5 CEMS Accuracy by RATA:

The relative accuracy test audit result is calculated from the following four formulas:

(1) Mean Difference

The mean difference of the data set is calculated according to:

$$\bar{d} = \frac{1}{n}\sum_{i=1}^{n} d_i$$

Where:

$\bar{d}$ = The mean difference of the data set.

n = Number of data points.

d_i = The difference between the installed CEM data average and the EPA test method data average for each test run (CEM test run average - EPA test method average).

(2) Standard Deviation

The standard deviation of the data set is calculated according to:

$$S_d = \left[\frac{\sum_{i=1}^{n} d_i^2 - \frac{\left(\sum_{i=1}^{n} d_i\right)^2}{n}}{n-1} \right]^{1/2}$$

Where:

S_d = The standard deviation of the data set.

n = Number of data points.

d_i = The difference between the installed CEM data average and the EPA test method data average for each test run (CEM test run average - EPA test method average).

(3) Confidence Coefficient

The 2.5 percent error confidence coefficient is calculated according to the following formula:

$$CC = t_{0.975} \frac{Sd}{\sqrt{n}}$$

Where:

CC = The 2.5 percent error confidence coefficient.

S_d = The standard deviation of the data set.

$t_{0.025}$ = The t-value from 40 CFR 60, Appendix B, Performance Specification 2, Section 8.1.

Table 8-1.

t-values from 40 CFR 60, Appendix B, Performance Specification 2, Section 8.1

n[a]	$t_{0.975}$	n[a]	$t_{0.975}$	n[a]	$t_{0.975}$
2	12.706	7	2.447	12	2.201
3	4.303	8	2.365	13	2.179
4	3.182	9	2.306	14	2.160
5	2.776	10	2.262	15	2.145
6	2.571	11	2.228	16	2.131

[a]The values in this table are already corrected for n-1 degrees of freedom. Use n equal to the number of individual values.

(4) Relative Accuracy

The relative accuracy of the data set is calculated according to the following formula:

$$RA = \frac{\left|\bar{d}\right| + \left|CC\right|}{\overline{RM}} \times 100$$

Where:

$\overline{RM}$ = The mean EPA test method (reference method) value.

$\bar{d}$ = The difference between the installed CEM data average and the mean EPA test method value.

CC = The 2.5 percent error confidence coefficient.

8.3 REPORTING REQUIREMENTS

The CEMS data is reported in accordance with the requirements 40 CFR part 60, Subpart A, and Appendix F.

Excess emissions and monitoring systems performance reports are submitted semi-annually in accordance with the ongoing reporting provisions State of Florida Title V Permit. All reports must be post-marked by the 30th day following the end of each six-month period, and must include the following information:

1. The magnitude of excess emissions, any conversion factor(s) used, the date and time of commencement and completion of each time period of excess emissions, and the process operating time during the reporting period.

2. Specific identification of each period of excess emissions that occurs during startups, shut-downs, and malfunctions of the affected facility. The nature and cause of any malfunction (if known), and the corrective action taken or preventative measures adopted.

3. The date and time identifying each period during which the continuous monitoring system was inoperative, except for zero and span checks, and the nature of the system repairs or adjustments.

4. When no excess emissions have occurred or the continuous monitoring system(s) have not been inoperative, repaired, or adjusted, such information shall be stated in the report.

The format of the summary report must correspond to the format presented in subsection 60.7(d) or in another format specified by the Administrator.

In accordance with 40 CFR 60, the owner or operator of the affected facility shall submit reports summarizing the following CEMS data:

1. The highest 24-hour daily average emission rate recorded for sulfur dioxide.

2. The highest 24-hour daily average emission rate recorded for nitrogen oxides.

3. The highest 24-hour daily average emission rate recorded for carbon monoxide.

4. The highest 24-hour daily average emission rate recorded for VOCs (as propane).

5. The total number of days that the minimum number of hours of data for sulfur dioxide, nitrogen oxides, total hydrocarbon and carbon monoxide data were not obtained.

6. The total number of hours that data for sulfur dioxide, nitrogen oxides, total hydrocarbon, and carbon monoxide were excluded from the calculation of average emission concentrations.

The data summary shall also provide the data specified for the calendar year proceeding the year being reported, in order to provide the Administrator with a summary of the performance of

the affected facility over a 2-year period. The data summary shall also highlight any emission or parameter levels that did not achieve the emission or parameter limits specified under 40 CFR 60. These reports shall be submitted annually, no later than February 1 of each year following the calendar year in which the data were collected. The reports must be submitted semiannually once the unit is subject to permitting requirements under Title V of the Act.

Semiannual reports must also be submitted which identify any calendar dates when any of the average emission rates for any recorded pollutant or parameter does not comply with the applicable limit of 40 CFR 60. For each of the dates identified the report must contain one of the following, as applicable:

1. The 24-hour daily average and/or 30-operating day block average sulfur dioxide emission rate.
2. The 24-hour daily average and/or 12-month rolling nitrogen oxides emission rate.
3. The 24-hour daily average and/or 30-operating day block average carbon monoxide emission rate.
4. The 24-hour daily average and/or 30-operating day block average VOC emission rate.

These reports shall be submitted by August 1 or by February 1 following the calendar half in which the data were collected.

All reports specified under 40 CFR 60 shall be submitted as a paper copy, postmarked on or before the required submittal date, and will be maintained on-site as a paper copy for a period of 5 years. The report submittal dates may be changed by mutual agreement between the owner or operator and the Administrator according to the procedures specified in 40 CFR part 60.19(c).

Appendix F requires the CEMS drift and accuracy data be compiled into a Data Assessment Report (DAR) for submittal to the Agency along with the excess emissions reports. At a minimum, the DAR must contain the following information.

1. Source owner or operator name and address.
2. Identification and location of monitors in the CEMS.
3. Manufacturer and model number of each monitor in the CEMS.
4. Complete documentation of the cylinder gas audit (CGA) or relative accuracy test audit (RATA) results, including the certified cylinder gas values, the CEMS responses, the reference method data collected during the RATA, and the calculations used to compute the accuracy audit results. If the accuracy audit results show the CEMS to be out-of-control, both the audit results showing the CEMS to be out-of-control and the results of the audit following corrective action showing the CEMS to be operating within specifications must be included in the DAR.

5. Results from any EPA performance audit samples analyzed during the accuracy audit.
6. Summary of all corrective actions taken when CEMS was determined out-of-control.

All data required by the applicable regulatory requirements including the data used to generate the quarterly CEMS reports must be kept on-site in a form suitable for inspection for a period of not less than five years from the date of record.

Startup and Shutdown of Kiln system

1.0 INTRODUCTION

1.1 Purpose

The purpose of this portion of the Kiln O&M plan is to provide clear and concise guidance for operation and maintenance of the Kiln system per NESHAP LLL requirements and suffice for Consent Order 13-1128, item 10.b, Contingency and Maintenance (C&M) Plan.

2.0 KILN OPERATION and MAINTENANCE DURING STARTUP

2.1 Startup Conditions

An operational throughput of greater than 86 tons per hour (TPH) represents startup for the kiln system.

2.2 Startup Operating Procedures

During startup, an automated computerized process control system is used, in conjunction with manual switches, "local", controls to start process equipment.

The kiln system consists of multiple components which are electronically interconnected and/or interlocked in groups within the system. The process control system and local on/off controls are designed and used to sequentially start the equipment within each group/system in a specific logical order. Equipment startup by the process control system is configured to minimize the potential of excess emissions, material spills and plugging. This approach minimizes the need for cleanup and the generation of fugitive particulate emissions.

The computerized process control system is designed with logic that will ensure the prescribed startup sequences are followed each time a process system and/or the pollution control equipment is started. Air pollution control devices are operating throughout startup and shutdown events. In the sequence of process startup; the associated pollution control equipment will be the first component to startup.

2.3 Kiln System Startup

The starting of the kiln system is typically divided into starts for functional areas designated as "group" and there are prescribed startup conditions that must be met before the system and/or the groups can be started. For example, the multiple pieces of equipment within a mill processing system can be divided into transport, lubrication, grinding, and feed group starts. The operator, through the computer controlled system, can sequentially activate each of the individual groups during startup. The system components are electronically interlocked to prevent startup of a piece of process equipment before activation of any related air pollution control device. As each group or piece of equipment is started, the specified startup and/or operating conditions for the group must be achieved prior to the startup of additional groups or equipment. These required conditions may include feed rate, temperature, pressure or motor current. The majority of the startup/operating conditions have preset high and low limits that will automatically alert the operator to abnormal conditions in the system and/or shut down the equipment when these limits are exceeded.

Equipment operators, process attendants and maintenance personnel are routinely checking or monitoring the equipment and process throughout each operation day. They will also perform prescribed maintenance and inspections during equipment operation and during scheduled downtime periods. The process systems

operating monitoring devices may include motion detectors, tilt switches, photo eyes, weight feeders/scales, temperature sensors and pressure sensors. These sensors are continuously sending data to the process control system to be archived and entered into various reports which track process indicators for throughput levels and equipment performance.

3.0 OPERATIONS and MAINTENANCE DURING SHUTDOWN

3.1 Shutdown Conditions

For the purpose of this plan, shutdown occurs when the kiln system process/equipment throughput is at 86 TPH, or the power to the process/equipment has been turned off. At or below these levels the operational efficiency would preclude process operation.

3.2 Shutdown Operating Procedures

During shutdown periods, an automated computerized process control system is used, in conjunction with manual switches, "local" controls to stop process equipment.

Shutdown within a process by the control system is configured to minimize the potential of material buildup, spills, plugging and aid in equipment re-start. This approach minimizes the need for cleanup and fugitive particulate emissions. This practice reduces the potential for air emissions by minimizing spillage and/or plugging of transfer and input points. During a controlled shutdown, process material flow may have to be slowly reduced to a minimal or zero output. This will allow feed/conveying systems to reduce or empty out material loads. This will minimize the potential for plugs and overflows during shutdown and allows for a more controlled and efficient startup.

The computer control system and local on/off controls are designed and utilized to ensure that air pollution control devices are operating during process operation and shutdown event. The air pollution control equipment will be the last piece of equipment to shutdown during the shutdown of the associated equipment.

3.3 Emission Control Equipment Shutdown

The process of shutting down a processing system is typically divided into groups for functional areas. The operator sequentially de-activates each of the individual groups during a shutdown for a processing system. Typically the emission control system is electronically interlocked with the last group or piece of equipment that is shutdown. This prevents shutdown of an air pollution control device before shutdown of a related piece of process equipment. The pollution control device will operate throughout the shutdown procedure and will be shutdown only after the entire process or group that it controls has been shutdown. In most cases the control equipment will operate for a prescribed time after the process has shutdown. This is sometimes needed to cool down the process or equipment as a matter of practice or to prepare for maintenance activities.

Should the pollution control equipment malfunction, the process must be shutdown as expeditiously as possible. In the case of large compartmentalized control devices, the device may have to operate after the malfunction to isolate the individual compartment affected. When excess opacity is present on such units, the efficient repair may dictate that the unit continues to operate until the compartment or compartments with the problem can be isolated.

Loss of production is no excuse to circumvent the shutdown of a process due to a control unit malfunction. However, the shutdown of the process may be controlled to prevent material plugs and overflows and/or equipment damage.

4.0 OPERATION and MAINTENANCE DURING MALFUNCTIONS

4.1 Process System Malfunction

A malfunction means any unavoidable mechanical and/or electrical failure of air pollution control equipment or process equipment or of a process resulting in operation in an abnormal or unusual manner. Accordingly, these events are unplanned and unscheduled.

If a malfunction of a process system requires shutdown of the source, that shutdown will be managed according to the procedures outlined in Section 3 of this document.

If a malfunction of an affected source or its associated air pollution control equipment results in an exceedance, then corrective action must be initiated immediately.

4.2 Alarmed Malfunctions

When a 3-hour average main baghouse inlet temperatur**e** limit is exceeded, the Data Acquisition Handling System will cause an alarm condition in the control room. The control room operator, upon receiving the alarm, will assess the operating conditions of the process system to determine the cause of the excess temperature and make process adjustments to maintain the inlet temperature below the limit. If process adjustments from the control room do not correct the malfunction the control room operator is responsible for initiating corrective action, including, but not limited to, the following:

- Requesting another employee to further investigate the situation;
- Contacting a Production Supervisor who initiates a work order for the problem to be corrected, and/or contacts maintenance personnel;

Any other action deemed necessary to correct the problem.When a 6-minute opacity limit for the main baghouse is exceeded, the Data Acquisition Handling System will cause an alarm condition in the control room. The control room operator, upon receiving the alarm, will assess the operating conditions of the process system and/or the baghouse to determine the cause of the excess opacity. If process adjustments from the control room do not correct the malfunction the control room operator is responsible for initiating corrective action including, but not limited to, the following:

- Requesting another employee to further investigate the situation;
- Contacting a Production Supervisor who initiates a work order for the problem to be corrected, and/or contacts maintenance personnel;
- Any other action deemed necessary to correct the problem.

4.3 Non-Alarmed Malfunctions

Certain types of malfunctions will not generate an alarm in the control room. These malfunctions include: holes in dust collector bags in sources other than those equipped with COMS, or bag leak detectors; holes or other openings in venting, ductwork, or other enclosed systems; improper operation or failure of equipment in areas that may generate fugitive emissions.

These types of malfunctions cannot typically be corrected by the computerized process control system. Plant personnel who are trained to notice abnormal particulate emissions most often detect these malfunctions during routine inspection or while performing general plant activities.

The control room operator once aware of the malfunction is responsible for initiating corrective action including, but not limited to, the following:

- Requesting another employee to further investigate the situation;
- Contacting a Production Supervisor who initiates a work order for the problem to be corrected, and/or contacts maintenance directly;
- Any other action deemed necessary to correct the problem.

4.4 Continuous Monitoring Systems

Corrective actions will be immediately implemented upon detection of a malfunction of the Continuous Emission Monitoring System or if the Continuous Opacity Monitoring System malfunctions and repairs will completed as expeditiously as possible.

4.5 Monitor Out of Control Condition

CEMS zero and high-level calibration drift is checked and calculated daily with excessive drift resulting in an "out-of-control condition" (OOC).

The beginning of the out-of-control period is the hour that a calibration drift check fails. The end of the out-of-control period is the hour following completion of successful calibration. Monitoring data collected during an "out-of-control" period can not be used for compliance demonstration and the period of OOC will be counted as monitor down time.

Performance Evaluations of the CEMS system will be routinely conducted and may consist of the following:

a. Error Assessment
b. Zero and Span Drift Checks
c. Evaluation of Microprocessor/Analog Output
d. Optical Alignment Checks
e. Optical Boundary Contamination
f. Quarterly Certified Filter Performance Audit
g. Quarterly Protocol Gas Audit

See Section 7 for more details on handling "OOC" situations.